

60-8

DOCKETED

AUG 22 1979

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

BALLY MANUFACTURING CORPORATION,)
Plaintiff,) CIVIL ACTION NO.
v.) 78 C 2246
D. GOTTLIEB & CO., a corporation,)
WILLIAMS ELECTRONICS, INC., a)
corporation, and)
ROCKWELL INTERNATIONAL CORPORATION,)
a corporation,)
Defendants.)

AFFIDAVIT OF ROBERT BROWNING IN
SUPPORT OF ROCKWELL'S MOTION TO DISMISS UNDER
RULE 12, FED. R. DIV. P.

Robert Browning, being duly sworn, deposes and says that:

(1) He has been an employee of Rockwell International Corporation (hereafter Rockwell) since 1962.

(2) In 1978 he was Manager of Subsystem Marketing at Rockwell and had marketing responsibility for a microcomputer controller (hereafter the Gottlieb Controller) manufactured and sold by Rockwell to D. Gottlieb and Co. (hereafter Gottlieb) for use in controlling operation of Gottlieb pinball machines.

(3) As Manager of Subsystem Marketing he also had marketing responsibilities in 1978 for a Rockwell general purpose industrial controller designated the Rockwell STC Controller Module.

(4) Because the Rockwell STC Controller Module was to be a differently programmed Gottlieb Controller, Rockwell sought permission from Gottlieb to use the Gottlieb Controller as the STC Controller Module. To this end, he drafted a letter to be sent to Gottlieb under the signature of R. E. McHenry of Rockwell. This letter was sent to Gottlieb on or about March 8, 1978 and is attached hereto as Exhibit A. Exhibit A shows paragraph 5 having the particular royalty rate expunged.

(5) He read and approved a follow-up letter to be sent to Gottlieb under the signature of C. D. Bopf of Rockwell. This letter was sent on or about April 10, 1978, and is attached hereto as Exhibit B.

(6) Gottlieb responded to the Rockwell requests by a letter dated April 17, 1978 which gave permission for Rockwell to use the Gottlieb Controller as the STC Controller Module. A copy of this letter is attached hereto as Exhibit C.

(7) Rockwell presented information on the STC Controller Module at several trade shows in 1978. He helped prepare a set of documents, attached hereto as Exhibit D, describing the STC Controller Module and which were for use at the trade shows.

(8) In the June 8, 1978 issue of Machine Design magazine, an article was published describing the Rockwell STC Controller Module. A copy of this article is attached hereto as Exhibit E.

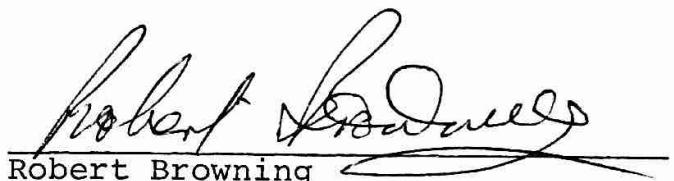
(9) In response to the aforementioned promotional activities, Rockwell received many inquiries from interested potential users

for the Rockwell STC Controller Module.

(10) Rockwell responded to one of the earlier inquiries for the STC Controller Module with a proposed system, including software. The inquiry and Rockwell's response are attached as Exhibits F1, F2.

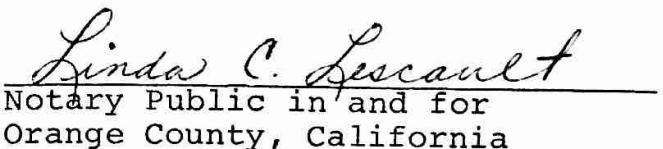
(11) One of the more recent inquiries as to the STC Controller Module was dated May 30, 1979, and inquired as to its applicability for controlling commercial dishwashers. This inquiry is attached hereto as Exhibit G.

Further affiant sayeth not.



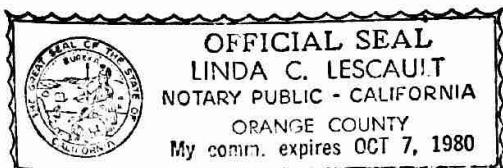
Robert Browning

SUBSCRIBED AND SWORN TO before me this 14th day of August, 1979.



Linda C. Lescault
Notary Public in and for
Orange County, California

[SEAL]



Electronic Devices Division
3310 Miraloma Avenue
P.O. Box 3869
Anaheim, CA U.S.A. 92203



Rockwell
International

March 8, 1978

D. Gottlieb & Company
165 West Lake Street
Northlake, Illinois 60164

Attention: Mr. Judd Weinberg

Dear Judd:

Pursuant to your discussion with Bob Browning of January 10th and your meeting with Chuck Bopf on March 7th, Rockwell requests your approval for independant Rockwell sales of a reprogrammed version of Gottlieb module Part No. PB000-D100.

The reason for the request is to allow Rockwell to utilize your pinball controller module as a controller module for industrial control applications. The initial application is proposed for use by a laundry equipment manufacturer as a controller for three separate and different laundry folding machines.

We would completely reprogram the system to act as a general purpose industrial controller, and then provide ancillary interface and a display module to meet the specific requirements of each program. In addition, for each specific job a PROM reprogramming is assumed to provide the means of customizing the controller for the required performance.

Regarding the potential volume usage of this module, I can only indicate that the first program we are evaluating represents about 500 to 1,000 systems per year, but additional applications will certainly be available and could lead to an estimated market of about 10,000 units per year.

Naturally, any deliveries would be on a non-interference basis with the Gottlieb contract as it may be amended. If any additional capital expenditures are necessary to meet these added requirements, it would be at Rockwell expense. We propose to pay a royalty to Gottlieb in the amount of [redacted] of the selling price of the unit and, of course, such sales would be auditable by independant auditors. Present estimate of the market value of the product would be approximately \$250.00 to \$300.00 per circuit board; of course, depending upon volume and duration of the program.

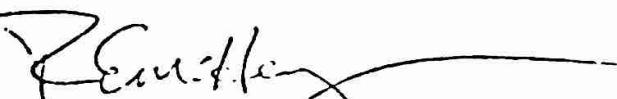
Mr. Judd Weinberg

March 8, 1978

Page Two

The Design Engineers' Show in mid-April '78 in Chicago is an ideal place to begin our marketing activity for the product. A favorable response from you prior to April 1st would allow us to proceed with our plans in support of that show.

Yours truly,



R. E. Mc Henry
Business Director
Subsystems Products

Electronic Devices Division
3319 Mission Avenue
P O Box 3660
Anaheim, CA U.S.A. 92803



Rockwell
International

A handwritten signature in black ink, appearing to read "C. D. Bopf". It is written over two parallel diagonal lines.

April 10, 1978

D. Gottlieb & Co.
165 West Lake Street
Northlake, Illinois 60164

Attention: Mr. Judd Weinberg

Dear Judd:

In our letter of March 8, we outlined a proposed program whereby Rockwell would reconfigure the basic Gottlieb controller board for sale as a standard industrial controller. I understand in conversation with R. E. McHenry and M. B. Northrup last week your response to our proposal is favorable.

To initiate marketing activity, we would like to introduce this product at the Design Engineer Show beginning April 17 in Chicago. I will be working with Bob Bloom this week on the necessary details to finalize the arrangements with respect to the specific product, its intended application and the royalty payment provisions. Meanwhile, we have prepared the attached brochure which, subject to your approval, we would like to use at the show beginning next week to promote this product. I will be in touch with you on this subject later this week.

Best regards,

ROCKWELL INTERNATIONAL CORPORATION
Microelectronic Devices

A handwritten signature in black ink, appearing to read "C. D. Bopf". Below the signature, the word "Manager" is written in a smaller, printed-style font.

/cmm

Attachment



165 W. Lake Street • Northlake, Illinois 60164 • Phone: 312 562-7100 • Telex: 72-6164

April 17, 1978

Mr. C. D. Bopf, Manager
Rockwell International
Electronic Devices Division
P.O. Box 3669
Anaheim, CA 92803

Dear Chuck,

This letter will confirm my phone message left last Friday advising that D. Gottlieb & Company sees no reason why Rockwell cannot distribute publicly the Rockwell brochure covering the STC Universal Controller Module in the format sent to us and covered by your letter of April 10, 1978.

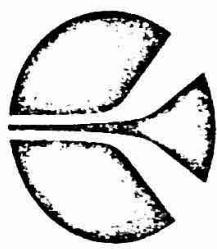
We appreciate the courtesy extended by you giving us the opportunity to review this and all future Rockwell published matter concerning directly or indirectly our pinball control system and/or any component thereof. We will continue to respond to your inquiries on as timely a basis as possible.

Sincerely,

D. GOTTLIEB & COMPANY

Robert W. Bloom
Vice President - Finance

RWB:dmn
cc: J. Weinberg
R. McHenry



Rockwell International

A NEW APPROACH
FOR INDUSTRIAL CONTROLLERS

S/S 805 ghs

GORDON H. SMITH

CHARACTERISTICS OF INDUSTRIAL CONTROLLERS

- LOW TO MODERATE QUANTITIES
- GENERALLY CONTROL ELECTROMECHANICAL DEVICES
- FLEXIBILITY REQUIRED
- MICROCOMPUTERS USED ONLY IN COST EFFECTIVE APPLICATIONS

GOALS OF NEW APPROACH

- ENHANCE APPLICATIONS FOR LOW QUANTITIES
- REDUCE SOFTWARE COST
- LOW COST HARDWARE
- EASY INTEGRATION
- QUICK DESIGN TURN AROUND

CLASSICAL APPROACH TO INDUSTRIAL APPLICATION OF MICROCOMPUTERS

- EXAMINE PROBLEM
- PICK MICROCOMPUTER FAMILY
- SELECT SINGLE BOARD COMPUTER OR SELECT DEVICES DESIGN AND FAB BOARD
- GENERATE SOFTWARE (FIRMWARE)
- INTEGRATE WITH SYSTEM

SOFTWARE APPROACHES

- MACHINE LANGUAGE PROGRAMMING
 - DEVELOPMENT HARDWARE INEXPENSIVE
 - TIME CONSUMING
- ASSEMBLY LEVEL PROGRAMMING
 - DEVELOPMENT HARDWARE MORE EXPENSIVE
 - LESS TIME
- INTERPRETERS
 - SOFTWARE EXPENSIVE FOR INTERPRETER
 - TAILED TO SPECIFIC REQUIREMENTS
 - UNDERSTANDABLE
- COMPILERS
 - GENERALLY CROSS COMPILED
 - LESS CONTROL

NEW APPROACH - ROCKWELL STC CONTROLLER

SEQUENCING TIMING COUNTING CONTROLLER

- BEST OF HARDWARE/SOFTWARE APPROACHES
- HARDWARE: SINGLE BOARD COMPUTER
- PROGRAM: COMPILER GENERATES INTERPRETER INSTRUCTIONS
INTERPRETER DECODED AND EXECUTED BY
SELF CONTAINED PROGRAM IN
SINGLE BOARD COMPUTER

STC HARDWARE CAPABILITIES

- FLEXIBLE INPUT/OUTPUT
 - 50 INPUTS _____ SINGLE LINE OR GROUPED INTO 4 BIT DIGITS
 - 60 OUTPUTS _____ SINGLE LINE OR GROUPED INTO 4 BIT DIGITS
 - 4 TIMERS
- FLEXIBLE REGISTER STORAGE
 - 16 BIT or 4 DIGIT COUNTER/STORAGE ELEMENTS - 32 SETS
 - SETS MAY BE OPERATED INDIVIDUALLY (MAX VALUE = 9,999)
 - SETS MAY BE COUPLED (MAX VALUE 99,999,999)
- FLEXIBLE CAPABILITIES
 - ON BOARD CMOS + BATTERY KEEPS REGISTERS WHEN POWER OFF
 - TIME OF DAY CLOCK OPTION

INPUT/OUTPUT ASSIGNMENT

Input Signal Function

| <u>Input Signal Assignment</u> | |
|--------------------------------|--------------|
| START (START PUSH BUTTON) | _____ = BIS1 |
| PRESOAK (PRESOAK SWITCH) | _____ = BIS2 |
| FULL (FULL SWITCH) | _____ = BIS8 |
| EMPTY (EMPTY SWITCH) | _____ = BIS9 |

Output Signal Function

| <u>Output Signal Assignment</u> | |
|--------------------------------------|---------------|
| AGITATOR (AGITATOR CLUTCH SOLENOID) | _____ = BOD1 |
| DETERGENT (DETERGENT VALUE SOLENOID) | _____ = BOD5 |
| COLD (COLD WATER VALUE SOLENOID) | _____ = BOD6 |
| PUMP (DRAIN WATER PUMP) | _____ = BOS14 |
| MOTOR (SPIN MOTOR) | _____ = BOS15 |

Other Assignments

| <u>Internal Flags</u> | |
|------------------------------|----------------|
| RINSE 1 (FIRST RINSE STATUS) | _____ = FLAG 3 |

SAMPLE APPLICATION

STATEMENT OF PROBLEM

BEGIN: WAIT UNTIL START IS ON; GO TO FILL AND RETURN - IF PRESOAK IS ON - WAIT 5 MINUTES. TURN AGITATOR ON.
WAIT 5 SECONDS, TURN DETERGENT OFF. WAIT 12 MINUTES, TURN AGITATOR OFF. GO TO DRAIN AND RETURN.

GO TO SPIN AND RETURN. TURN RINSE1 OFF

RINSE: TOGGLE RINSE1. GO TO FILL AND RETURN. TURN AGITATOR ON,
WAIT 1 MINUTE, TURN AGITATOR OFF. GO TO DRAIN AND RETURN. GO TO
SPIN AND RETURN. IF RINSE1 IS ON, GO TO RINSE. GO TO BEGIN

STATEMENT OF PROBLEM (Cont)

- FILL:** TURN HOT ON, TURN COLD ON, WAIT UNTIL FULL IS ON. TURN HOT OFF; TURN COLD OFF; RETURN
- DRAIN:** TURN PUMP ON, WAIT UNTIL EMPTY IS ON. TURN PUMP OFF. RETURN
- SPIN:** TURN MOTOR ON, WAIT 30 SECONDS. REPEAT NEXT 4 STEPS 3 TIMES:
 - (1) TURN HOT ON, (2) WAIT 8.5 SECONDS, (3) TURN HOT OFF, (4) WAIT 20 SECONDS.
 - WAIT 2.8 MINUTES; TURN MOTOR OFF. RETURN

SAMPLE PROGRAM

YOU HAVE ALREADY SEEN IT

DESIGN FLOW USING STC CONTROLLER

- DEFINE SIGNALS AND FUNCTIONS
- KEY INTO PROM COMPILER
- PLUG PROMS INTO STC CONTROLLER

STC CONTROLLER COMMANDS

| COMMAND | FUNCTION |
|---|--|
| If (f) ON If (f) OFF | f = STATUS INDICATOR, INTERNAL INDICATOR, DISCRETE INPUT, DISCRETE OUTPUT |
| If (f1) EQUAL (f2) If (f1) GREATER THAN (f2) If (f1) LESS THAN (f2) | f1, f2, = TIMERS, DISPLAYS, COUNTERS, DIGITAL INPUTS, TIME-OF-DAY CLOCK, CONSTANTS |
| GO TO (function) AND STAY GO TO (function) AND SET TO RETURN | FUNCTION = NAME OF ANY COMMAND IN PROGRAM |
| RETURN | RETURNS TO NEXT INSTRUCTION AFTER ONE WHICH SET TO RETURN |

STC CONTROLLER COMMANDS (Cont)

| <u>COMMAND</u> | <u>FUNCTION</u> |
|---|--|
| Turn (f) ON Turn (f) OFF | f = STATUS INDICATOR, INTERNAL INDICATOR, DISCRETE OUTPUT |
| SET (f1) EQUAL TO (f2) | f1 - DISPLAY, TIMER, COUNTER, DIGITAL OUTPUT, DIGITAL INPUT, TIME-OF-DAY CLOCK, CONSTANT |
| TOGGLE (f) (If ON TURN OFF, If OFF, TURN ON) | f = STATUS INDICATOR, INTERNAL INDICATOR, DISCRETE OUTPUT |

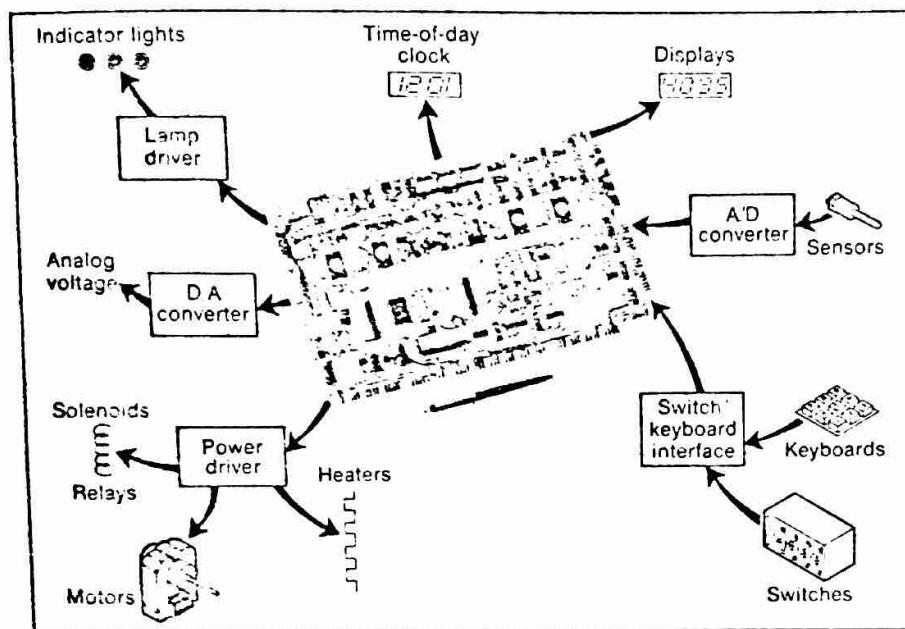
STC CONTROLLER COMMANDS (Cont)

| <u>COMMAND</u> | <u>FUNCTION</u> |
|---|--|
| ADD (f2) to (f1) SUBTRACT (f2) from (f1) | f1 = DISPLAY, TIMER, COUNTER, DIGITAL OUTPUT |
| | f2 = DISPLAY, COUNTER, TIMER, DIGITAL OUTPUT, DIGITAL INPUT, CONSTANT |
| MULTIPLY (c) by (n) | C = COUNTER n = XX.XX |
| REPEAT (n1) COMMANDS (n2) TIMES | n1 = NUMBER OF COMMANDS n2 = NUMBER OF TIMES |

STC CONTROLLER COMMANDS (Cont)

| COMMAND | FUNCTION |
|---|---|
| WAIT (s) SECONDS | s = 0.1 to 3600 SECONDS |
| WAIT (m) MINUTES | m = 1 to 128 MINUTES |
| WAIT (h) HOURS | h = 1 to 128 HOURS |
| WAIT UNTIL (f) is ON WAIT UNTIL (f) is OFF | f = TIMER, DISCRETE INPUT |
| CONVERT (f1) to (f2) FROM (table) | f1 = PLAY, COUNTER, DIGITAL OUTPUT f2 = COUNTER, DIGITAL INPUT |
| | TABLE = NAME OF CONVERSION TABLE |

Product Controller Is Programmed in English



English-programmable module is designed to replace electromechanical components in a variety of control applications where sequencing, timing, and counting functions are required. The module is described as being economic to customize for one or 1,000 machines.

A new microprocessor-based controller module can be programmed in plain English. Developed by Rockwell International, the module offers an easy and low-cost way to computerize a wide variety of products.

Called the STC universal controller module, the device provides sequencing, timing, and counting (hence STC) functions on a pre-designed, pretooled printed-circuit board. In many applications, it is expected to keep product design and production costs low and to be cost effective in quantities from one to 1,000.

Programming is by means of English language commands that enable the design engineer to write the control program for his own product, even if he knows nothing about computers. Module

Example: Programming Commands To a Washing Machine

INPUT/OUTPUT ASSIGNMENTS: Start (pushbutton), presoak (switch), agitator (clutch solenoid), detergent (valve solenoid), rinse-1 (status flag), hot (water-valve solenoid), cold (water-valve solenoid), full (indicator), empty (indicator), pump (drain water pump), and motor (spin motor).

PROGRAM LISTING:

```

Begin
Wait until start is on
Go to fill & return
If presoak is on wait 5 min
Turn agitator on
Turn detergent on
Wait 5 sec
Turn detergent off
Wait 12 min
Turn agitator off
Go to drain & return

```

Go to spin & return

```

Turn rinse-1 off
Rinse
Toggle rinse-1
Go to fill & return
Turn agitator on
Wait 1 min
Turn agitator off
Go to drain & return
Go to spin & return
If rinse-1 is on go to rinse
Go to begin

```

FILL

```

Turn hot on
Turn cold on
Wait until full is on
Turn hot off
Turn cold off
Return

```

DRAIN

```

Turn pump on
Wait until empty is on
Turn pump off
Return

```

SPIN

```

Turn motor on
Wait 30 sec
Repeat next 4 commands 3 times
Turn hot on
Wait 8.5 sec
Turn hot off
Wait 20 sec
Wait 2.8 min
Turn motor off
Return

```

The 13 Types of Command

| Command | Function(s) | Description |
|---|--|---|
| If (f) on | (f) = indicator, discrete input or output, etc. | Causes the next command to be performed only if the specified condition is met |
| If (f) off | | |
| If (f1) = (f2) | (f1), (f2) = timers, displays, counters, inputs, outputs, etc. | Similar to the above IF commands, but operation is conditional |
| If (f1) > (f2) | | |
| If (f1) < (f2) | | |
| Go to (label) and stay | (label) = label of any command in program | Next and subsequent commands will be found at the location identified by the specified (label) |
| Go to (label) and set to return | | |
| Return | | Next and subsequent commands will be found immediately following the last Go to (label) and set to return command given |
| Turn (f) on | (f) = indicator, discrete output | Causes the specified function to be turned on or off |
| Turn (f) off | | |
| Set (f1) equal to (f2) | | Causes function one to be set equal to function two |
| Toggle (f) | | Turns (f) off if it is on and vice versa |
| Add (f2) to (f1) | Both are displays, timers, counters, etc. | Adds or subtracts the two |
| Subtract (f2) from (f1) | | |
| Multiply (c) by (n) | (c) = counter; (n) = 2, 4, 8, or 16 | |
| Divide (c) by (n) | | |
| Repeat (n1) commands (n2) times | (n1) = number of commands, (n2) = number of repetitions | |
| Wait (s) seconds, or (m) minutes or (h) hours | | Delays the next command |
| Wait until (f) is on | | |
| Wait until (f) is off | | Delays the next command until the function has turned on or off |
| Convert (f1) to (f2) from (table) | | Converts function one to function two based on a user-specified conversion (table) |

The Functional Features

The STC universal controller accepts 13 command types. Other functional features include:

- 32 four-digit counters can independently count to 9,999 or can be coupled to count to 99,999,999.
- 50 inputs and 60 outputs.
- Digital inputs and outputs can be binary or decimal.
- 4 timers provide timing down to 0.1-sec intervals.
- 32 digits of display.
- On-board battery backup retains the setting of all counters when power is off.
- Time-of-day clock allows processes to be monitored and sequenced at specific times.

Hydraulic Fluids Double as Cutting Fluid

Until recently, there has been no completely effective way to keep hydraulic fluid from contaminating the cutting fluid in machine tools. A new fluid developed by E.F. Houghton & Co. may solve the problem by eliminating the need for fluid segregation. Hydra-Cut 496 can be used in both the hydraulic circuit and the cutting-coolant circuit of most machine tools.

Depending on the type of hydraulic system used, the new fluid

can be used as hydraulic fluid neat, or mixed with water. Diluted with water to 3 to 5% concentration, it can also be used as a cutting coolant. Small amounts of fluid leaking from one system to the other do not require draining, cleaning, and refilling; they merely change fluid concentration a bit.

Hydra-Cut 496 is compatible with most of the elastomers commonly employed in hydraulic systems. However, it has a pH of 10.2 as supplied, and 9.2 in 5% solution,

so leather seals should be replaced with a compatible elastomer before converting to the new fluid.

The fluid is inhibited to protect against corrosion for both metal-cutting and hydraulic applications. It provides good anti-wear characteristics for hydraulic systems, and has the film strength and frictional properties needed for metal cutting. None of the fluid components are hazardous by NIOSH definition.

INN (cont'd)

THOMAS ENGINEERING INC.

Central and Ela Roads, P.O. Box 198 • Hoffman Estates, Illinois 60195

Area Code 312 / 358-5800
Telex #28-1054

May 3, 1978

Subsystems Applications Engineering
D/833-051 RC 33
Rockwell International Microelectronics Devices
P. O. Box 3669
Anaheim, CA. 92803

Dear Sirs,

We are interested in adapting your STC Universal Controller Module as displayed at the recent Design Engineering Show in Chicago to some of our line of pharmaceutical process equipment. Of immediate interest is the Accela Cota which is used to coat tablets with either sugar or film coating.

The basic process is one of spraying for a short period of time, drying for a period of time, repeating this cycle with possibly different times and coatings as the coating thickness builds on the tablets and signalling when all is done. The entire elapsed time can be as great as 24 hours but with time accuracies of one (1) second or better. In addition, overriding controls from inlet air temperature, exhaust air temperature and humidity as well as manual override are desired. Also, since the "recipe" followed varies with type of tablet and coating, a means of this change must be provided for operating personnel.

Your unit seems to be well adapted for this usage with its time and counting capability as well as the capability to stop and hold the time/count if there is any interruption.

The following is a list of the input, output, displays and control functions that are desired:

A. Inputs - Analog signals applied through A/D converters that if not proper will suspend program but not reset it to start.

1. Inlet air temperature (must be above ____ ° C).
2. Exhaust air temperature (must be below ____ ° C).
3. Exhaust relative humidity (must be below ____ %).

OMAS ENGINEERING INC.

-2-

B. Outputs (independently controlled)

1. Spray from nozzle A, B, or C or any combination.
2. Not spray.
3. Coating pan rotating.
4. Coating pan not rotating.
5. Alarm if any input condition is out of limits.

C. Displays

1. Some form of display easily recognizable by operating personnel that show them they have put in the program correctly.
2. Same display can be used to tell operating personnel where the coating cycle is during the actual cycle.

D. Basic program (see next page)

The above information is necessarily vague due to the large number of recipes used in the pharmaceutical industry and our desire to furnish as "universal" a control as possible. What we are primarily interested in at this time are answers to the following list of questions:

1. Is your STC module truly applicable to this application?
2. On a low volume basis (10 or less a year), what would be the cost of the module assuming we would provide the necessary input and output interfaces?
3. What would be the cost and type of operator controlled input device to insert the required recipe (program) information?
4. What type of display do you feel would be most "legible" to relatively unskilled (not even English speaking) operating personnel?

Very truly yours,

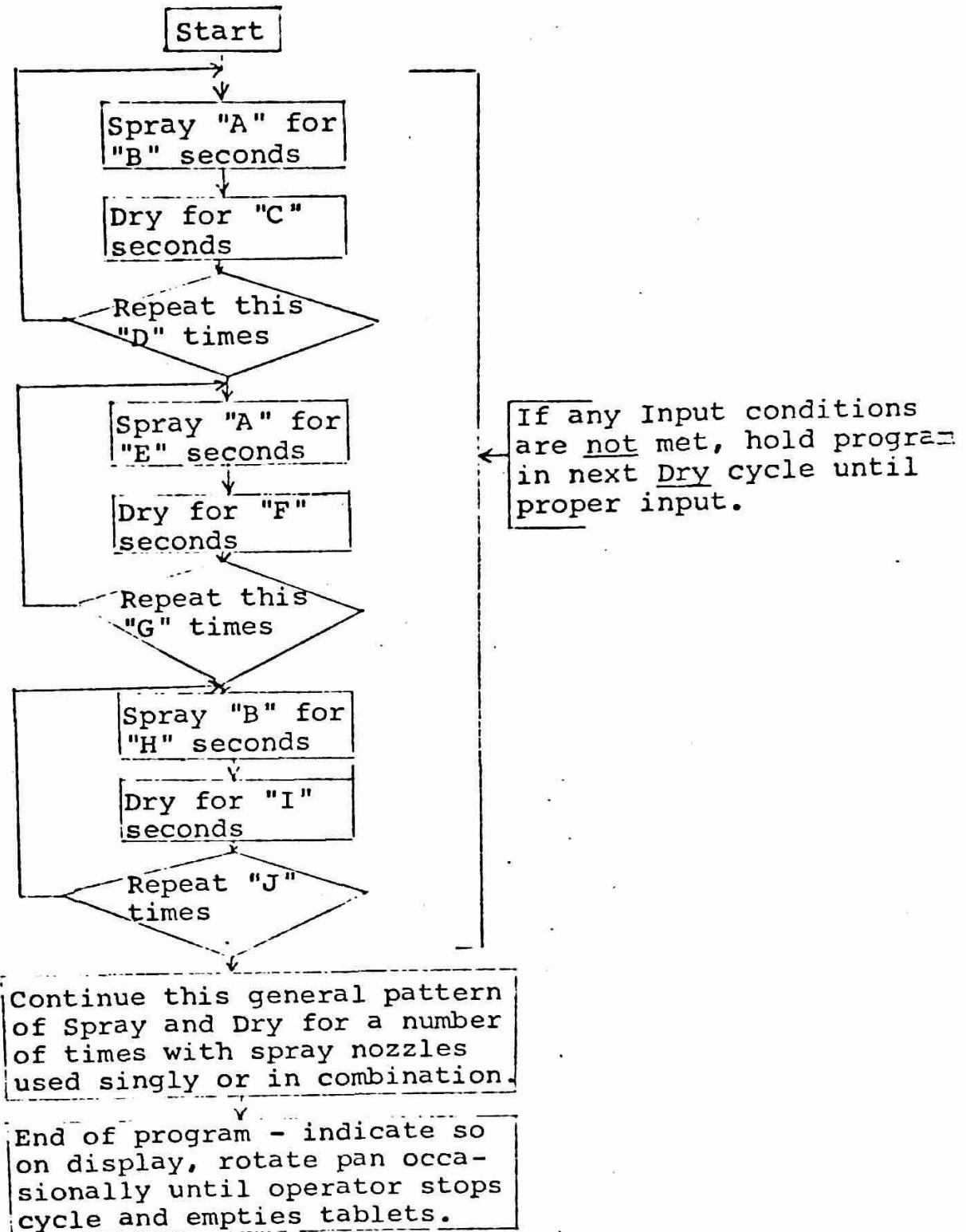
THOMAS ENGINEERING INC.

E. H. Beneke
E. H. Beneke
Electronic Engineer

EHB/sm

CC: D. R. Meyer, Chief Engineer
Rockwell Microelectronics, DesPlaines, Il.

D. Basic program





Electronic Devices Division
3310 Miraloma Avenue
P.O. Box 3669
Anaheim, CA U.S.A. 92803

Rockwell
International

May 12, 1978

Thomas Engineering Incorporated
Central and Ela Roads
P.O. Box 198
Hoffman Estates, Illinois 60195

Attention: Mr. E. H. Beneke

Reference: Your letter of May 3, 1978

Dear Mr. Beneke:

Thank you for the referenced letter of May 3rd and for your expressed interest in our STC modules.

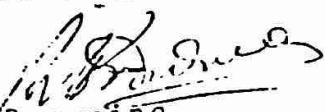
Attached you will find a brief engineering evaluation of your problem and, as you can see, the proposed solution is fairly straight forward. The STC modules can easily perform the tasks outlined and, as indicated, we suggest thumb wheel switches to set up the ten potential programs and a simple two digit type display to indicate program status with another two digit display to indicate repeat status on any step.

We have not evaluated in any way the cost of the I/O or Operator Interface hardware. However, for your information, the STC modules on the basis of ten units would be \$300.00 each with modules available for first delivery in August of this year.

At the present time, we are completing an Operator's Handbook which will include application notes for all the conventional I/O hardware; motors, switches, displays, etc., and will also include greater details of the software and its implementation. This handbook will be available approximately mid-June and I will forward a copy at that time.

I hope the attached data answers most of your questions and if not, please do not hesitate to contact us if you need additional information.

Yours very truly,


R. Browning
Marketing Manager
Subsystems

/b1

enclosures a/s

IN AIR



NO COLD

EXHAUST AIR EXHAUST AIR



TOO HOT



HUMIDITY HIGH

5-10-78

GRATING

CONTROLS

START

STOP

CONTINUE

DONE



SWITCHES

No.

CYCLE REPEATS
TO GO

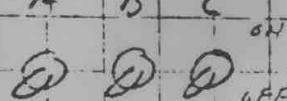
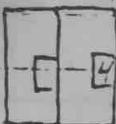


NOZZLE

REPEAT
SELECT

SELECT

A B C



SPRAYING



DRIING



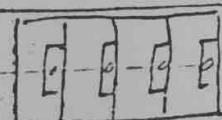
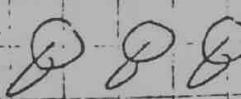
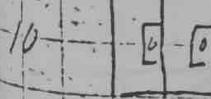
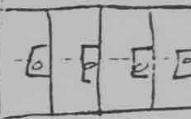
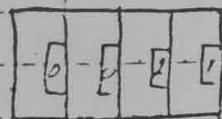
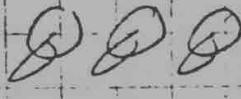
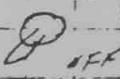
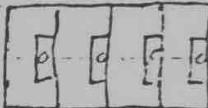
INDICATORS

DRY TIME
SELECT - SEC

TURNBLAD

SELECT

SPRAY TIME
SELECT - SEC



SWITCHES
IMPLEMENTED

THUMB WHEEL
SWITCHES

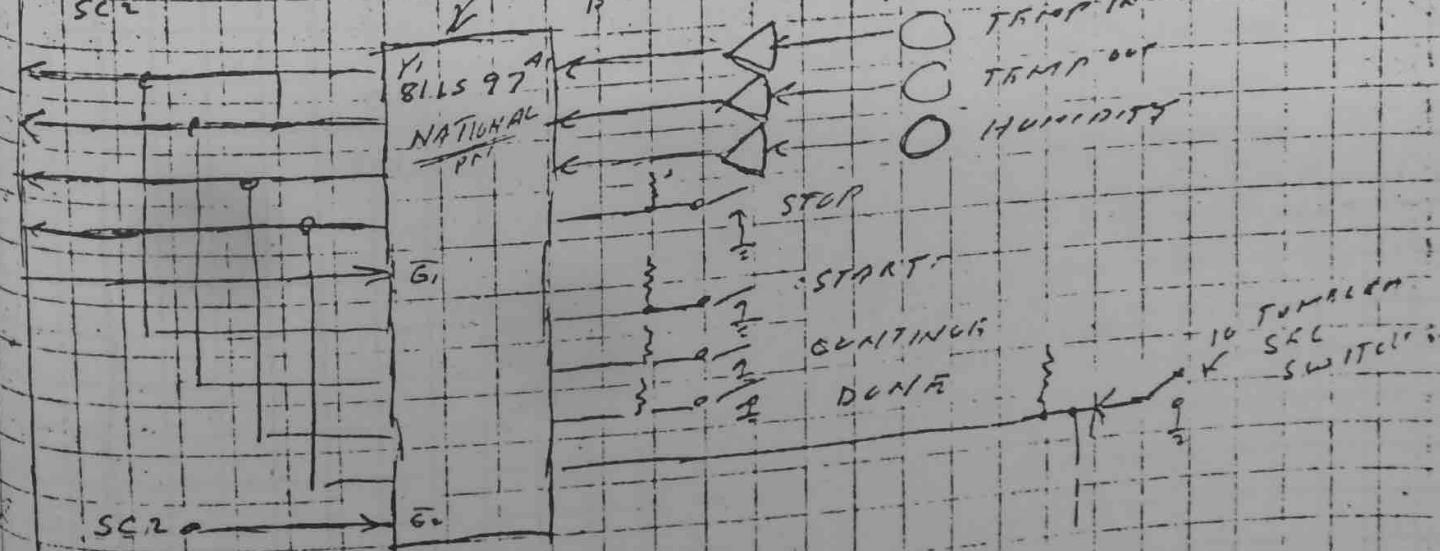
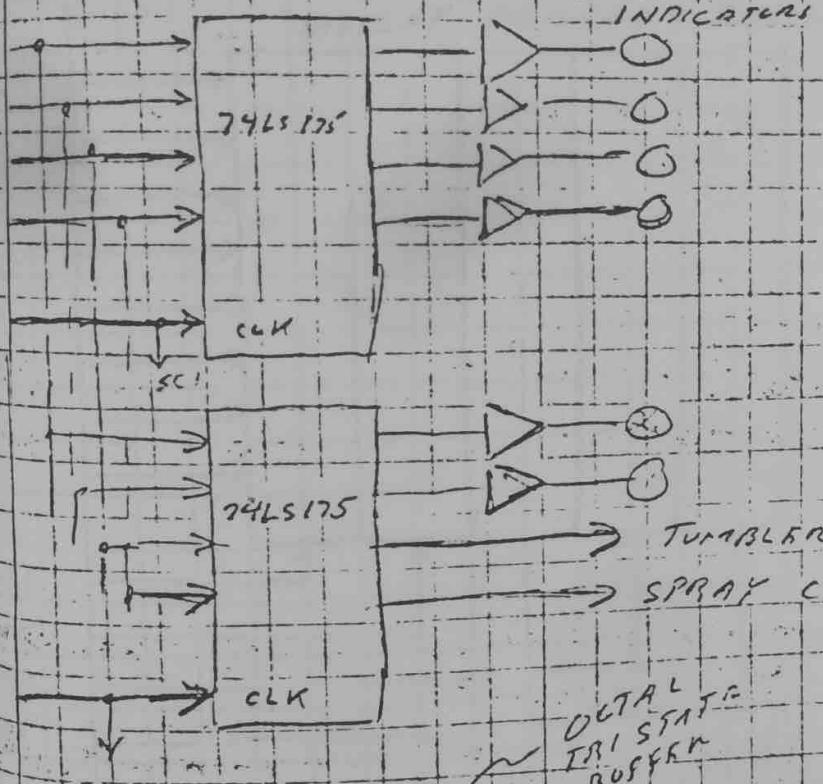
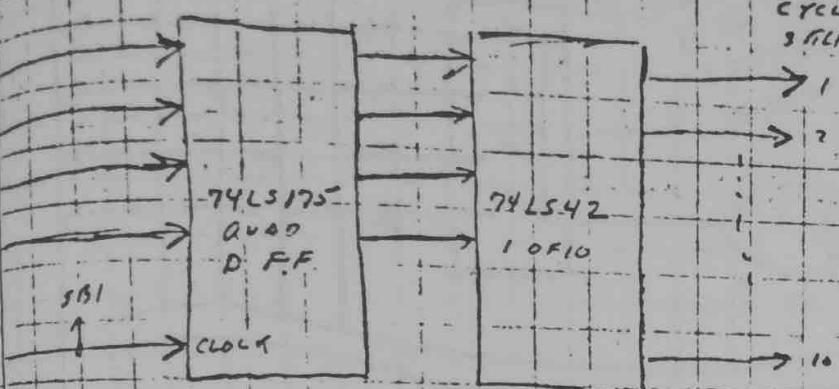
SWITCHES

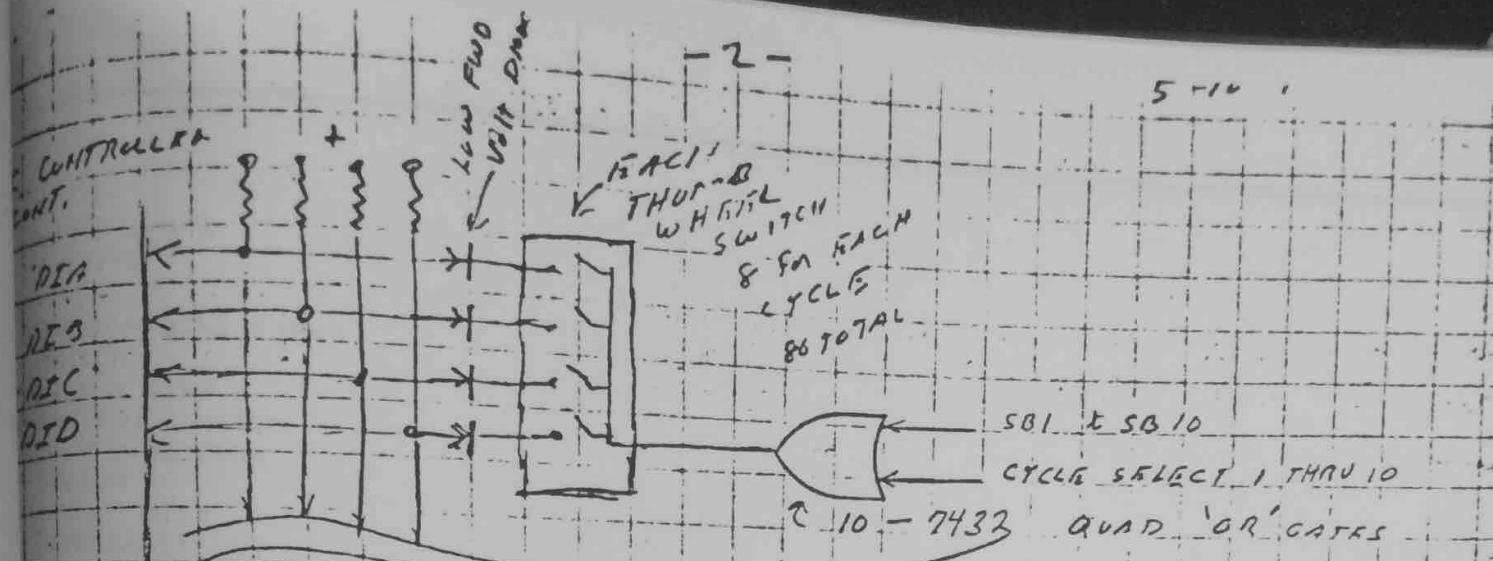
EX-G

POSSIBLE
MECHANICAL

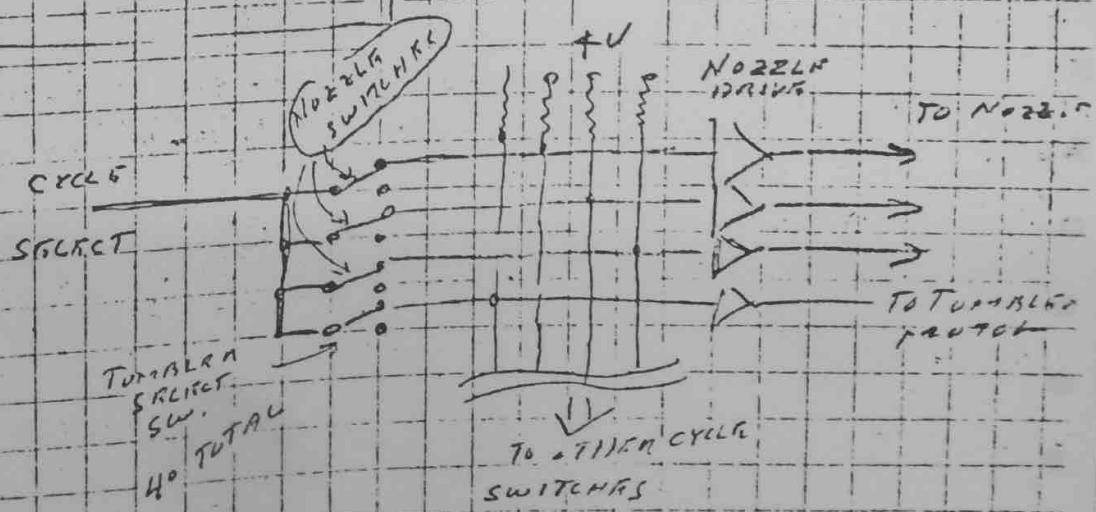
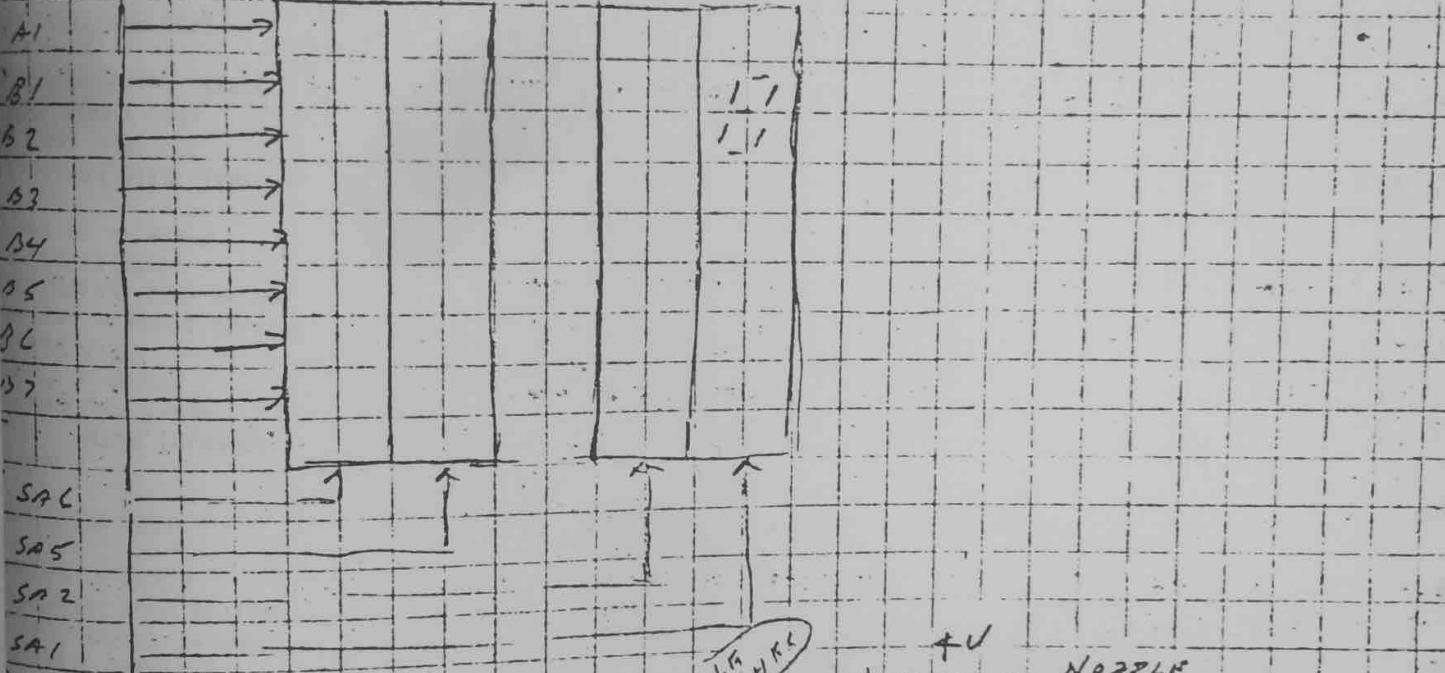
5-10-78

CONTROLLER





DISPLAY DRIVERS & DISPLAYS



; DEFINE I/O'S

5/11/78

; STARTSW = B1S1 START
SWITCH

CONTIN = B1S2
CONTINUE SWITCH

DONE = B1S3 DONE
SWITCH

TUMSH = B1S4
TUMBLER SELECT

SWITCH
CYCLED = D001 CYCLE
SELECT OUTPUT

; INDICATORS OUT

; INTEMP = B0S1 INPUT
AIR TOO COLD

OUTTEMP = B0S2
EXHAUST AIR TOO
HOT

OUTHUMID = B0S3
EXHAUST AIR
HUMIDITY TOO HIGH

CYCLOMP = B0S4 CYCLE
COMPLETE

SPRAY1 = B0S5
SPRAYING LAMP

DRY1 = B0S6 DRYING
LAMP

; CONTROLS OUT

TUMBLER = B0S7

TUMBLER PAN MOTOR
SPRAY = B0S8 SPRAY
NOZZLE CONTROL

; THUMB WHEEL SW
INPUTS

SPRAYT = D11 SPRAY



TIME

DRYT = D12 DRY TIME

REPEAT = D13 NO.

; TIMES TO REPEAT

; COUNTERS

NOREP = CNTR17

WORKING COUNTER

FOR NO TIMES TO

REPEAT

CYCLE = CNTR18

COUNTER FOR CYCLE

NUMBER

; TIMER

TIME = TIME WORKING

; TIMER

; DISPLAYS

DISFR = DSEL1 NUMBER

OF REFERTS TO GO

DYSMC = DSPL2

CURRENT CYCLE

NUMBER

R = DSPL1 NUMBER
REFEATS TO GO
C = DSPL2
CURRENT CYCLE
MARKER

DA = FLAG1
DB = FLAG2

VF = VFLG VECTOR

DIABLE
CHART OF COMMANDS

RYO
ENABLE ON
TUMBLER OFF
SPRAYC OFF
IN TEMPR OFF
OUT TEMPR OFF
OUT HUMID OFF
CYCLICMP OFF
SPRAY1 OFF
DRY1 OFF
DISPR = 0
DISPC = 0

AT STARTSN ON
CYCLE = 0
RY1

TO 1 TO CYCLE
SET DISPC = CYCLE
SET DISPLAY FOR
CYCLE NUMBER
SET CYCLE0 = CYCLE
SET THE CYCLE E
COUNTER UP
IF REPEAT = 0 GO TO
ENTRY1
SET NOREP = REPEAT
SET THE REPEAT
COUNTER TO THE
SWITCH INPUTS
SET DISPR = REPEAT
SET UP THE REPEAT
DISPLAY

ENTRY2

SET TIME = SPRAYT
SUBTRACT 1 FROM
DISPR DECREASES
THE NUMBER OF
REPEATS TO GO BY
ONE
TURN DRYT OFF
TURN TUMBLER ON
TURN SPRAYC ON
TURN SPRAY1 ON TURN
INDICATOR LAMP ON
FOR SPRAY

UNTIL TIME IS
OFF

TURN SPRAYC OFF

TURN SPRAY1 OFF
TURN DRYT ON TURN
INDICATOR LAMP FOR

1. SPRAY OFF

TURN SPRAY1 OFF
TURN DRY1 ON TURN
INDICATOR ON FOR
DRY CYCLE
ET TIME = DRY1

WAIT UNTIL TIME IS
OFF;
SUBTRACT 1 FROM
NOREP
IF NOREP > 0
GO TO ENTRY2
GO TO ENTRY1

ENTRY3

TURN DRY1 OFF
TURN SPRAY1 OFF
TURN CYCLEM1 ON

ENTRY4

TURN TUMBLER ON
SET TIMER = 10 SEC

ENTRY5

IF DONESW ON
GO TO ENTRY6

IF TIMER ON
GO TO ENTRY5

SET TIMER = 60 SEC
TURN TUMBLER OFF

ENTRY6

IF DONESW ON
GO TO ENTRY6
IF TIMER ON
GO TO ENTRY6
GO TO ENTRY6

STOPSN/VECT4 STOP
SNITCH INPUT

GO TO ENTRY51

TEMPIN/VECT1 IN/ET
AIR TEMP SENSOR

TURN INTEMP ON
GO TO ENTRY51

TEMPOUT/VECT2
EXHAUST TEMP
SENSOR

TURN TEMPOUT ON

ENTRY51

TURN FLAG1 OFF
TURN FLAG2 OFF

IF SPRAYC ON
TURN FLAG1 ON
IF TUMBLER ON
TURN FLAG2 ON

DEMO1

; TURN TEMP OUT ON

; ENTRY51

; TURN FLAGA OFF

; TURN FLAGB OFF

; IF SPRAYC ON

TURN FLAGA ON

IF TUMBLER ON

TURN FLAGB ON

TURN SPRAYC OFF

TURN TUMBLER OFF

; ENTRY52

; IF DONESW ON

GO TO ENTRY6

IF CONTSW OFF

GO TO ENTRY52

; IF FLAGA ON

TURN SPRAYC ON

IF FLAGB ON

TURN TUMBLER ON

TURN INTEMP OFF

TURN OUTTEMP OFF

TURN OUTHUMID OFF

RETURN

;

HUMIDITY/VENT3

EXHRUST AIR

HUMIDITY SENSOR

; TURN OUTHUMID ON

GO TO ENTRY51

;

END

cc: accl. gen.
Barr
Johnson
#161

QUARTERMAN LEE
PROFESSIONAL ENGINEER
911 MAIN STREET
KANSAS CITY, MISSOURI 64105
816-471-7682

May 30, 1979

Rockwell International
Micro-Electronic Devices
Sub-Systems Application Engineering, D/833-051RC33
PO Box 3669
Anaheim, California 92803

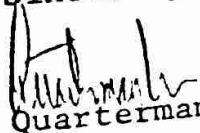
Gentlemen:

As Consulting Engineer for American Dish Service of Kansas City, Missouri I am in the process of designing a new model for their line of commercial dish washers. We would like to investigate the possibility of using electronic control and your STC Universal Controller Module appears to be appropriate for this machine. I have enclosed an electrical diagram and a sequence diagram and would appreciate it if you would look this over and get back to me.

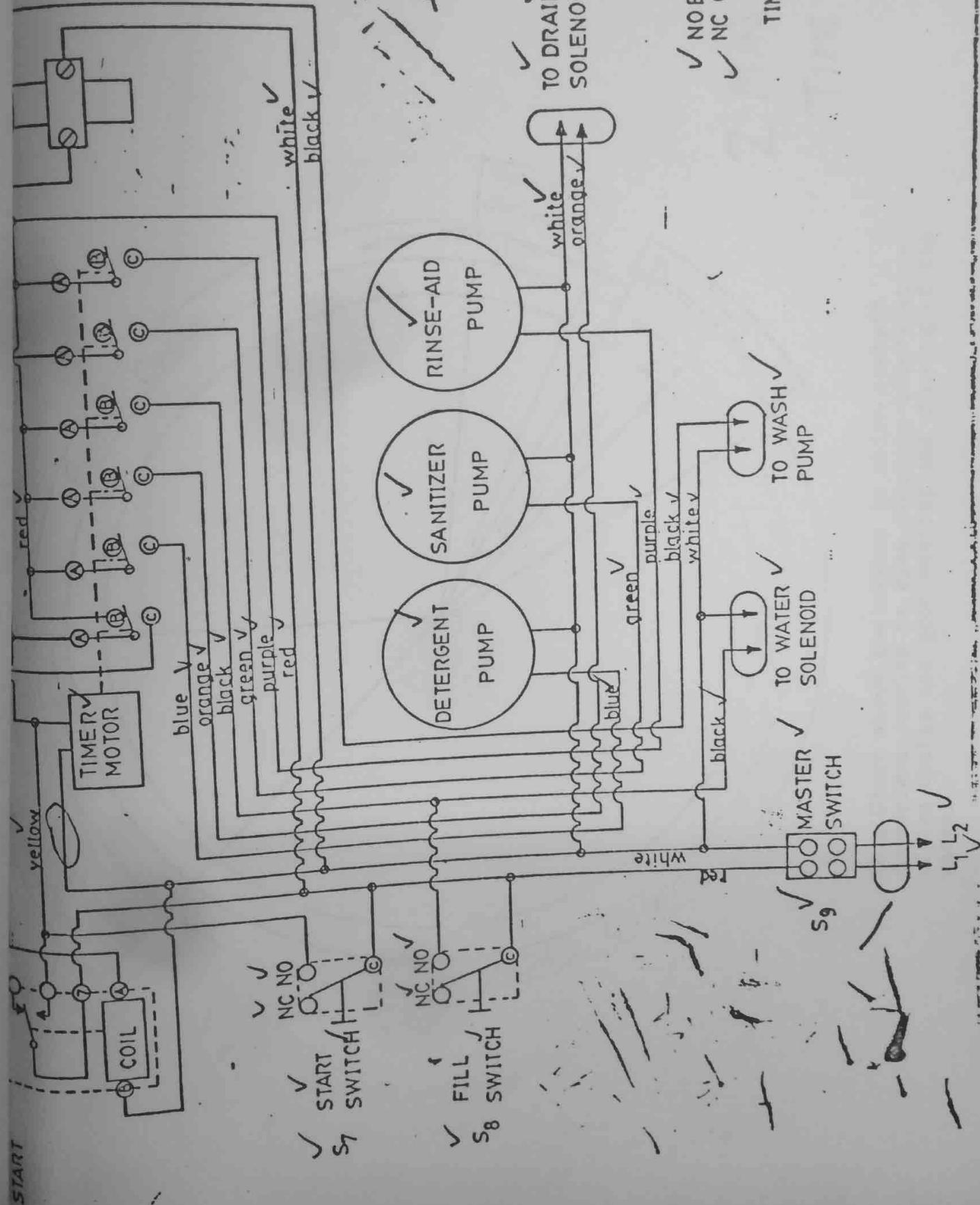
We anticipate initial production of about 2,000 units per year, eventually going up to 4,000 to 5,000 units.

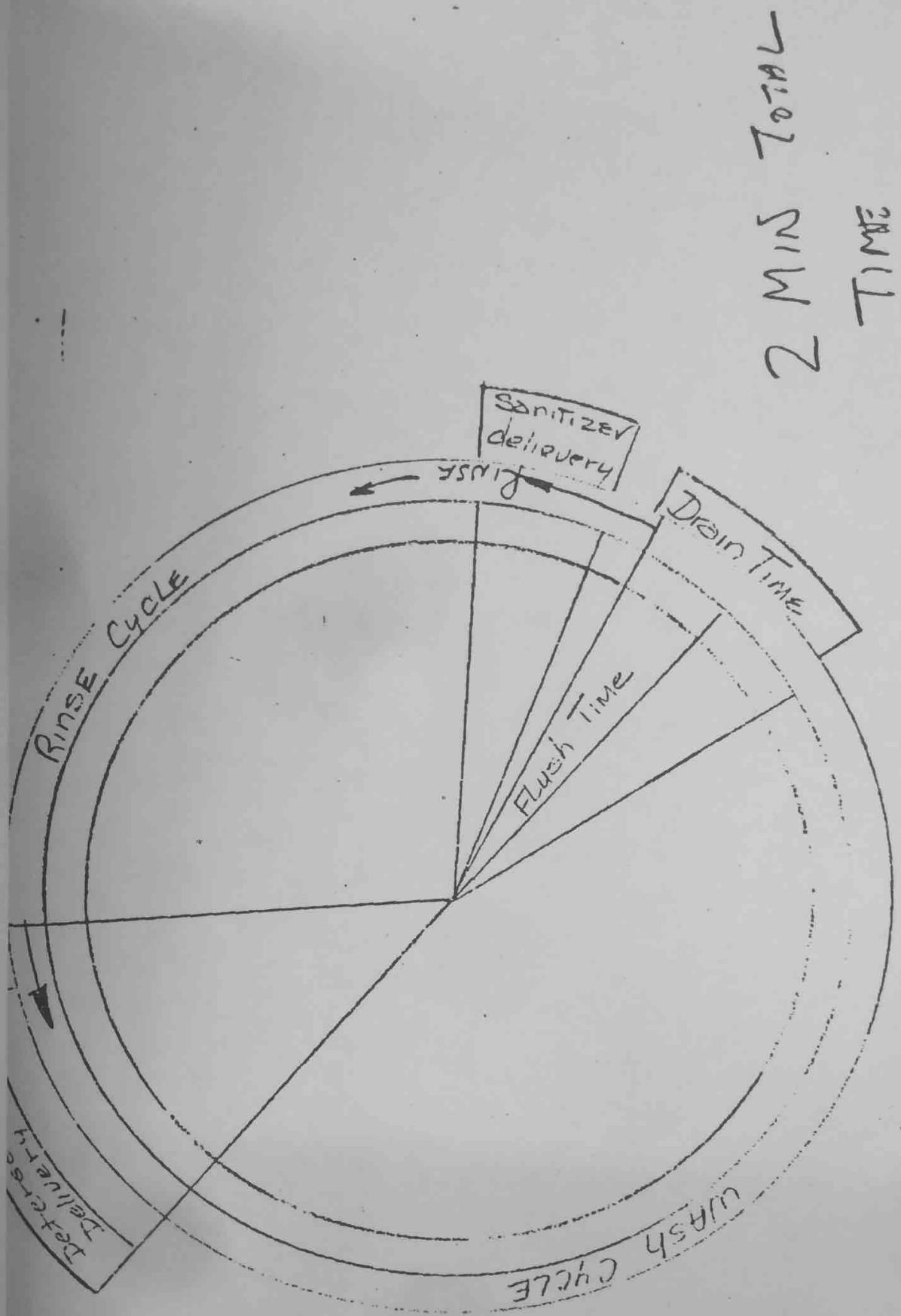
Thank you for your assistance and I look forward to your prompt reply.

Sincerely,


Quarterman Lee

Enc.
gh





This Chart shows the manner in which certain operations overlap to give complete coordination of the cycles and good washing and rinsing of the wares.